

ABSTRACT OF THE DISCLOSURE

A method for manufacturing an optical member of a fluoride crystal includes: a growing step of growing an ingot of a fluoride crystal; a cutting-out step of cutting out from the ingot a cylindrical basic material with two parallel planes which have a certain crystal plane orientation; an orientation-determining step of determining a crystal orientation of a side surface of the cylindrical basic material; a birefringence-measuring step of measuring birefringence in a specific crystal axis direction at the side surface determined based on the crystal orientation determined in the orientation-determining step; and an evaluating step of evaluating the fluoride crystal on the basis of a result of measurement of the birefringence. A fluoride crystal is obtained in which a maximum value of birefringence in a specific crystal axis direction at a side surface is not more than 10 nm/cm at a measurement wavelength of 633 nm. A high-resolution lens suitable for an oblique incident beam and an exposure apparatus using the lens are provided.